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#### **Authors**

Matessa, Michael  
Anderson, John R.

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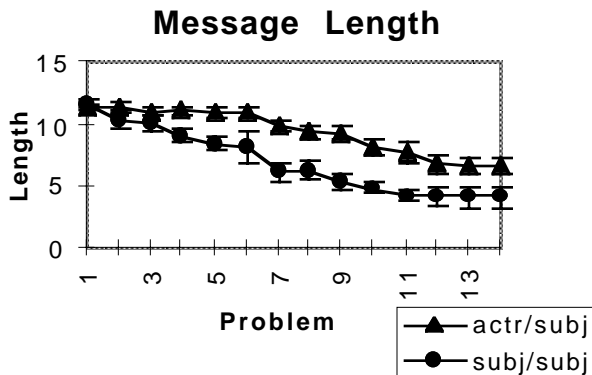
# An Adaptive Model of Simple Communication

Michael Matessa & John R. Anderson (matessa@cmu.edu)

Department of Psychology; Carnegie Mellon University  
Pittsburgh, PA 15213 USA

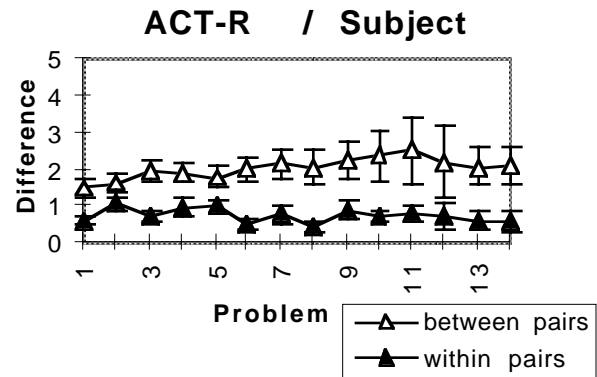
When people communicate they try to establish mutual knowledge. Garrod and Anderson (1987) proposed that a way to minimize effort during this process would be to follow a “output/input coordination” principle, where output to a partner is formulated according to the same principles of interpretation as those needed to interpret input from a partner. A computational model of establishing mutual knowledge efficiently can be given in the ACT-R architecture (Anderson & Lebiere, 1998) where goals that are completed successfully can be retrieved and used later. Applied to communication, goals of presenting and accepting information include semantic and syntactic representations of that information, and these goals can later be retrieved to provide templates for the creation of new utterances. Results from an ACT-R model communicating with human subjects show similar performance to that of human subjects communicating together.

The ACT-R model incorporates current theories of collaborative communication which fit naturally into the architecture. These theories include the creation of common ground by way of successful goals of presentation and acceptance (Clark & Schaefer, 1989), the use of dialogue acts to represent actions performed by speech (Core & Allen, 1997), the use of communicative obligations to motivate conversation (Traum & Allen, 1994), and the use of input from a partner to formulate output to that partner (Garrod & Anderson, 1987).



Subjects in a communication task were found to use fewer words to solve problems over time. An ACT-R model

interacting with subjects also used fewer words over time because previous utterances from its human partner were used as templates to create new utterances.



This behavior can be shown to be partner-dependent by showing the difference in message length within pairs is less than the difference between pairs. This was true for both the ACT-R model interacting with subjects and subjects interacting with other subjects.

Work in progress includes the creation of a model that purposely formulates output that is different than the input from a partner's speech to test the effect of non-accommodation on communicative efficiency.

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